

## Dividing With Fractions

**I**n earlier investigations of this unit, you learned to use addition, subtraction, and multiplication of fractions in a variety of situations. There are times when you also need to divide fractions. To develop ideas about when and how to divide fractions, let's review the meaning of division in problems involving only whole numbers.

### Getting Ready for Problem 4.1

Students at Lakeside Middle School raise funds to take a field trip each spring. In each of the following fundraising examples, explain how you recognize what operation(s) to use. Then write a number sentence to show the required calculations.

- The 24 members of the school swim team get dollar-per-mile pledges for a swim marathon they enter. The team goal is to swim 120 miles. How many miles should each swimmer swim?



- There are 360 students going on the field trip. Each school bus carries 30 students. How many buses are needed?
- The school band plans to sell 600 boxes of cookies. There are 20 members in the band. How many boxes should each member sell to reach the goal if each sells the same number of boxes?

Compare your number sentences and reasoning about these problems with classmates. Decide which are correct and why.

# 4.1

## Preparing Food



TEKS / TAKS

6(12)A Communicate mathematical ideas using language and numerical, physical, or algebraic mathematical models. 6(13)A Make conjectures from sets of examples.

There are times when the amounts given in a division situation are not whole numbers but fractions. First, you need to understand what division of fractions means. Then you can learn how to calculate quotients when the divisor or the dividend, or both, is a fraction.

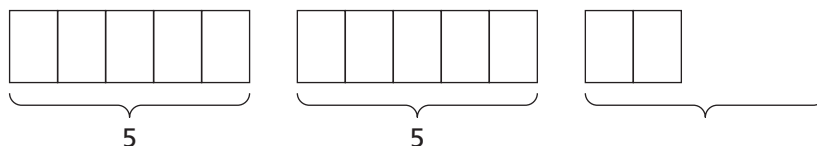
When you do the division  $12 \div 5$ , what does the answer mean?

The answer should tell you how many fives are in 12 wholes. Because there is not a whole number of fives in 12, you might write:

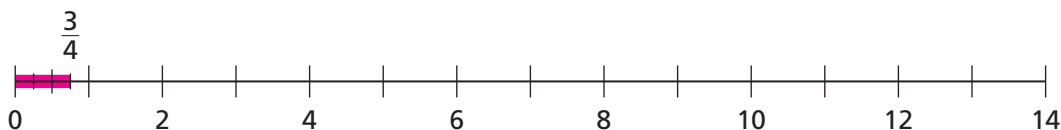
$$12 \div 5 = 2\frac{2}{5}$$

Now the question is, what does the *fractional part* of the answer mean?

The answer means you can make 2 fives and  $\frac{2}{5}$  of another five.



Suppose you ask, “How many  $\frac{3}{4}$ ’s are in 14?” You can write this as a division problem,  $14 \div \frac{3}{4}$ .



Can you make a whole number of  $\frac{3}{4}$ ’s out of 14 wholes?

If not, what does the fractional part of the answer mean?

As you work through the problems in this investigation, keep these two questions in mind.

*What does the answer to a division problem mean?*

*What does the fractional part of the answer to a division problem mean?*

## Problem 4.1 Dividing a Whole Number by a Fraction

Use written explanations or diagrams to show your reasoning for each part. Write a number sentence showing your calculation(s).

- A.** Naylah plans to make small cheese pizzas to sell at a school fundraiser. She has nine bars of cheese. How many pizzas can she make if each pizza needs the given amount of cheese?

1.  $\frac{1}{3}$  bar

2.  $\frac{1}{4}$  bar

3.  $\frac{1}{5}$  bar

4.  $\frac{1}{6}$  bar

5.  $\frac{1}{7}$  bar

6.  $\frac{1}{8}$  bar

- B.** Frank also has nine bars of cheese. How many pizzas can he make if each pizza needs the given amount of cheese?

1.  $\frac{1}{3}$  bar

2.  $\frac{2}{3}$  bar

3.  $\frac{3}{3}$  bar

4.  $\frac{4}{3}$  bar

5. The answer to part (2) is a mixed number. What does the fractional part of the answer mean?

- C.** Use what you learned from Questions A and B to complete the following calculations.

1.  $12 \div \frac{1}{3}$

2.  $12 \div \frac{2}{3}$

3.  $12 \div \frac{5}{3}$

4.  $12 \div \frac{1}{6}$

5.  $12 \div \frac{5}{6}$

6.  $12 \div \frac{7}{6}$

7. The answer to part (3) is a mixed number. What does the fractional part of the answer mean in the context of cheese pizzas?

- D. 1.** Explain why  $8 \div \frac{1}{3} = 24$  and  $8 \div \frac{2}{3} = 12$ .

2. Why is the answer to  $8 \div \frac{2}{3}$  exactly half the answer to  $8 \div \frac{1}{3}$ ?

- E.** Write an algorithm that seems to make sense for dividing any whole number by any fraction.

- F.** Write a story problem that can be solved using  $12 \div \frac{2}{3}$ . Explain why the calculation matches the story.

**ACE** Homework starts on page 55.

## 4.2

## Fundraising Continues



**TEKS / TAKS**

**6(12)A** Communicate mathematical ideas using language and numerical, physical, or algebraic mathematical models. **6(13)A** Make conjectures from sets of examples.

**W**hile figuring prizes for the games at their fundraiser, students and teachers face more fraction problems!